



Agilent OpenLAB

CDS ChemStation Edition

Emergency Procedures

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Agilent Technologies

Introduction

OpenLAB Chromatography Data System (CDS) ChemStation Edition is supported in a number of different configurations. All these configurations may require network communication beyond instrument connectivity. The networking infrastructure in different laboratories can have different levels of stability, reliability, and robustness.

OpenLAB CDS provides a number of features to make it resilient against network or server outages. In case of a network or server outage, all running or queued sequences continue to run, and the data acquired is stored in the OpenLAB ECM queue on the Workstation or AIC, respectively. The data can be uploaded to OpenLAB ECM once the emergency situation is over. However, there will also be situations where users will want to start a ChemStation session during a network or server-outage.

This document describes emergency concepts and procedures that ensure continued operation of OpenLAB CDS ChemStation Edition C.01.03 in case of network failures or server outages.

For the OpenLAB CDS Distributed System, this concept uses a workstation-based approach to remediate server unavailability. It requires dedicated failover workstation licenses that are commercially available. In addition, Agilent is investigating an approach that will be based on the existing AIC systems. This concept may become available within the next six months. For customers who have an urgent need for failover configuration we recommend to use the concept described in this technical note to ensure continued operation of their OpenLAB CDS Distributed System in case of network or server outages.

Networking is involved in multiple areas:

- Instrument communication: Transfer of commands, methods and data
- Authentication: Startup of the OpenLAB Shared Services Control Panel and startup of OpenLAB CDS ChemStation (from OpenLAB Control Panel)
- Status reporting: ChemStation to OpenLAB Shared Services server
- Data upload: ChemStation to OpenLAB ECM
- Licensing: Licenses are retrieved from the License server (OpenLAB Shared Services server by default)

Communication can be impacted if either the network or one of the following backend services is not available:

- OpenLAB Shared Services server
- OpenLAB ECM server
- Windows Domain Controller, DNS server etc.
- License server

The introduction chapter provides an overview of the different services and their roles in the system. After this overview, the following chapters describe how failures of these services or missing connectivity to these services can be handled.

ChemStation as a Connected Application

Depending on the system configuration ChemStation has a number of connections to other systems, see [Figure 1](#) on page 3 for more information.

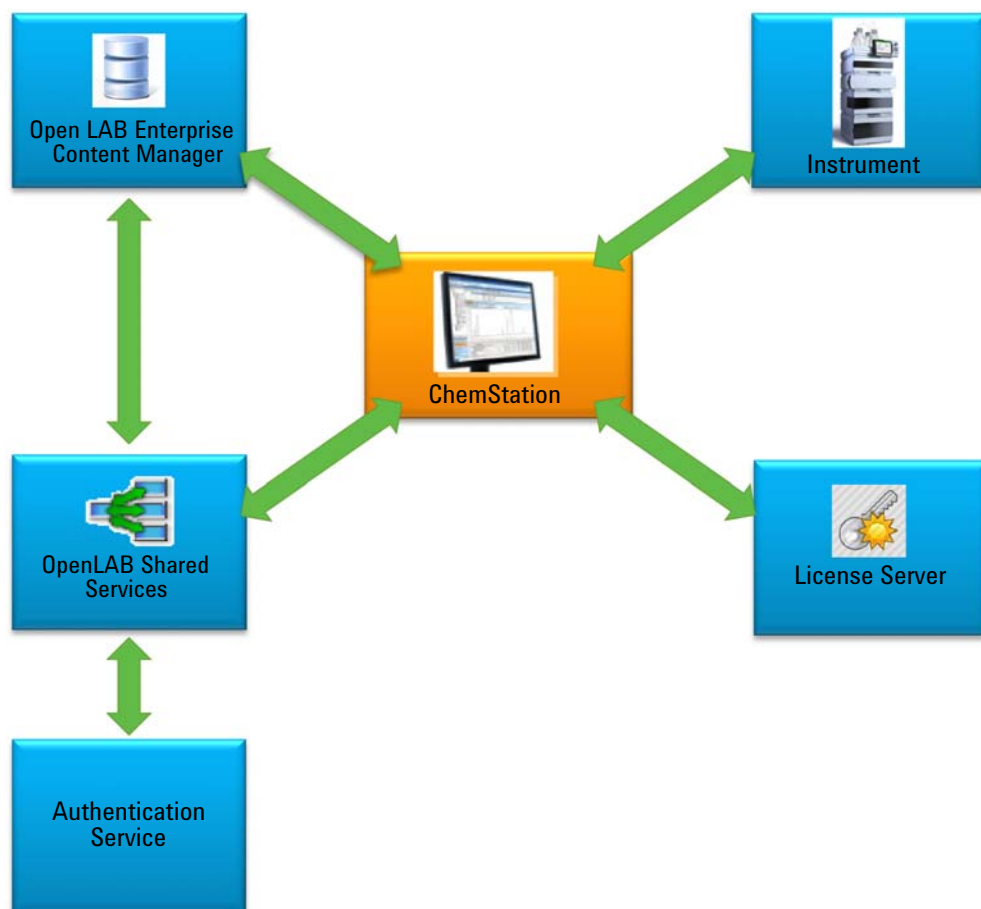


Figure 1 Connections to other systems depending on the system configuration of the ChemStation

Table 1 Purpose of the various communication channels and backend systems

System	Purpose	Startup	Runtime	Comment
OpenLAB Shared Services server	<p>Always required.</p> <ul style="list-style-type: none"> Transfers authentication information. Provides privileges for current user (authorization). Provides information about license server location. Receives and distributes instrument status. Receives activity log. 	authentication/ authorization/ license server	Instrument status and activity log	<p>Runtime communication is not mandatory – status information is discarded in case the OpenLAB Shared Services server is not available. The activity log is buffered.</p> <p>Authentication may need a backend authentication service (OpenLAB ECM or Windows Domain Controller).</p>
License server	<p>Always required.</p> <p>Provides licenses for ChemStation features.</p>	Provides licenses	N/A	<p>At runtime no further license checks are done. Licenses are mandatory.</p> <p>License server is installed on the OpenLAB Shared Services server host machine.</p>
OpenLAB ECM server	<p>Optional data storage backend.</p> <p>Versioned backend data storage for ChemStation data.</p>	Authentication (through OpenLAB Shared Services)	Data upload and download	<p>In an OpenLAB ECM-based system the OpenLAB ECM server has two roles – authentication and backend storage. The runtime dependency is not mandatory since ChemStation places uploads into a queue if OpenLAB ECM is not available.</p>

Scenarios

There are two main scenarios in case of a failure of a backend system or a network outage. In the first scenario the application (OpenLAB Control Panel or ChemStation) is already running and continuous operation must be ensured. In the second scenario the application has not been started and has not yet established connections to one or more of the backend systems.

Scenario 1: ChemStation is Running

ChemStation acquires all of the required resources at startup:

- Licenses
- Privileges
- OpenLAB ECM Connection Token (if applicable)

Once the ChemStation is started, the OpenLAB Shared Services server and/or OpenLAB ECM server may become unavailable:

- If the OpenLAB Shared Services server is not available, then instrument status is no longer reported and activity logs are buffered for deferred upload. Data acquisition and OpenLAB ECM upload are still possible.
- If the OpenLAB ECM server is not available, then data upload to OpenLAB ECM is no longer possible. Instead data is put into the queue and can be uploaded to OpenLAB ECM once the OpenLAB ECM server is available again.
- In either case re-authentication is not possible, i.e. it is not possible to login in case of a session lock or switch to a different user. To allow users to break the session lock, checkmark the **Break Session Lock** option in the ChemStation Administration Tool.

NOTE

If the OpenLAB ECM server is unavailable, data are automatically queued. Once the OpenLAB ECM server is available again, queued data needs to be manually uploaded to OpenLAB ECM (see the section titled *Troubleshooting - ECM server is not available after login* in the *Agilent OpenLAB CDS ChemStation Edition with ECM Concepts Guide* – P/N M8301-90080).

NOTE

In the Distributed System, the existing ChemStation sessions on the AIC continue to run and acquire data. However, it is not possible to connect to these sessions from the remote client and to see their status in OpenLAB Control Panel.

Scenario 2: ChemStation Startup

For ChemStation startup two main services are required:

- Licenses: Depending on the instrument configuration some licenses are mandatory in order to start up ChemStation. A core license is always required. This requires a connection to the license server.
- Authentication: When an authentication mode other than None is specified, the user must authenticate with his username and password. This requires a connection to the authentication backend (OpenLAB Shared Services server, OpenLAB ECM server, or Domain Controller).

Licensing

OpenLAB CDS ChemStation Edition needs to connect to a license server that holds valid licenses. If the license server is unavailable or ChemStation cannot connect to it, ChemStation cannot start up. If the central license server is not available it is possible to fall back onto a local licensing service. This local licensing service needs to be populated with licenses (for details, see [“Preparation: Licenses”](#) on page 10).

For an OpenLAB ECM-based system, please ensure that you have all methods and sequences that are required even if OpenLAB ECM is unavailable locally on the workstation. This may require periodic updates of the local methods and sequences from master methods and sequences kept in OpenLAB ECM (for details, see [“Preparation: Methods and Sequences”](#) on page 9).

Authentication Service

If any of the required authentication backends (OpenLAB Shared Services server, OpenLAB ECM server, or Domain Controller) is not available, for the Networked Workstation a failover mechanism allows users to switch to a local instance of OpenLAB Shared Services. Failover to the local OpenLAB Shared Services instance allows users to startup ChemStation. Instruments need to be set up in the local OpenLAB Shared Services database manually (for details, see section [“Preparation: Instrument Configuration”](#) on page 9).

For the Workstation, no failover is possible as the ChemStation is already connecting to the local OpenLAB Shared Services. If the ChemStation workstation is integrated with OpenLAB ECM it uses OpenLAB ECM authentication. If the connection to OpenLAB ECM is lost, the ChemStation can no longer be started.

For the Distributed System it is not possible to failover directly on the CDS client or the AIC. For instruments that are required to run continuously (24/7), we suggest setting up an OpenLAB CDS ChemStation Edition Workstation on a separate PC using failover licenses. This workstation can be used as a failover system in case of an emergency.

Networked Workstation: Failover to Local OpenLAB Shared Services Instance – Preparation

Preparation: Local OpenLAB Shared Services Configuration

If you are falling back to a local OpenLAB Shared Services instance, the default authentication mode is **None**. This allows users to work with the ChemStation without authentication. All users have all privileges. If user authentication is desired, use the authentication mode **Internal**. The other authentication modes (Windows Domain and OpenLAB ECM) are not adequate for the failover situation because they introduce dependencies to external systems.

The authentication mode **None** is the default and nothing needs to be done in preparation for the authentication mode **None**. If you wish to use the authentication mode **Internal**, you will need to switch to the local OpenLAB Shared Services instance, configure it to use the authentication mode **Internal**, setup users, and setup and assign roles as desired.

- 1 On the local OpenLAB Control Panel open the **Administration** page (see [Figure 2](#) on page 7) and select the **Local Configuration** node in the **Navigation** pane.

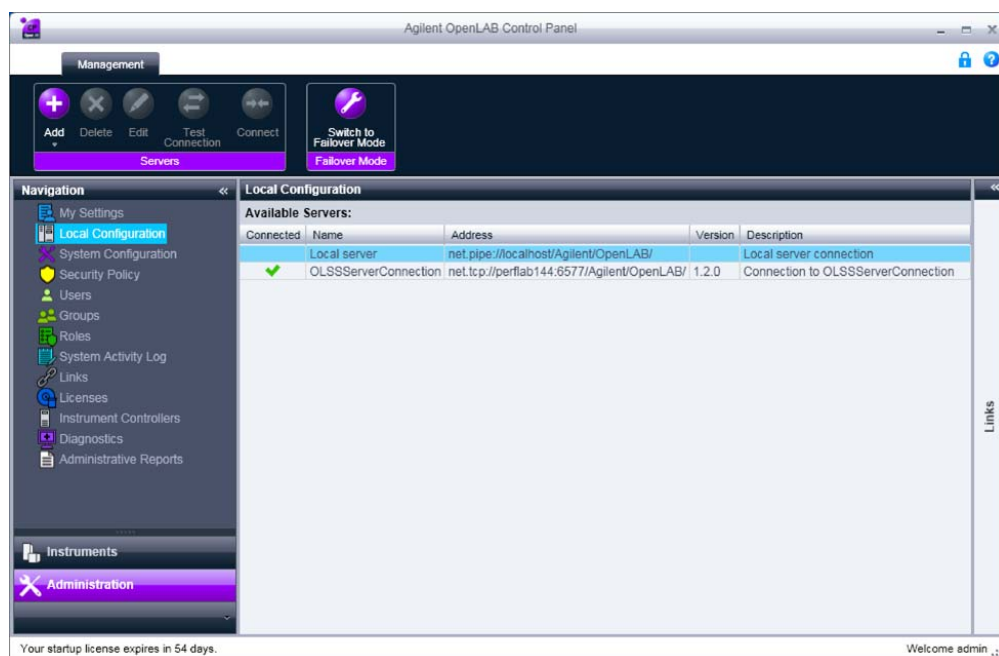


Figure 2 Switch to local OpenLAB Shared Services instance

- 2 Click the **Switch to Failover Mode** button.
- 3 Confirm the usage of the failover mode and the restart of the OpenLAB Control Panel.
- 4 Setup the authentication mode **Internal**. Set up users, and set up and assign roles as desired.

Reconnect to the central OpenLAB Shared Services Server

- 1 On the local OpenLAB Control Panel open the **Administration** page (see Figure 3 on page 8) and select the **Local Configuration** node in the **Navigation** pane.

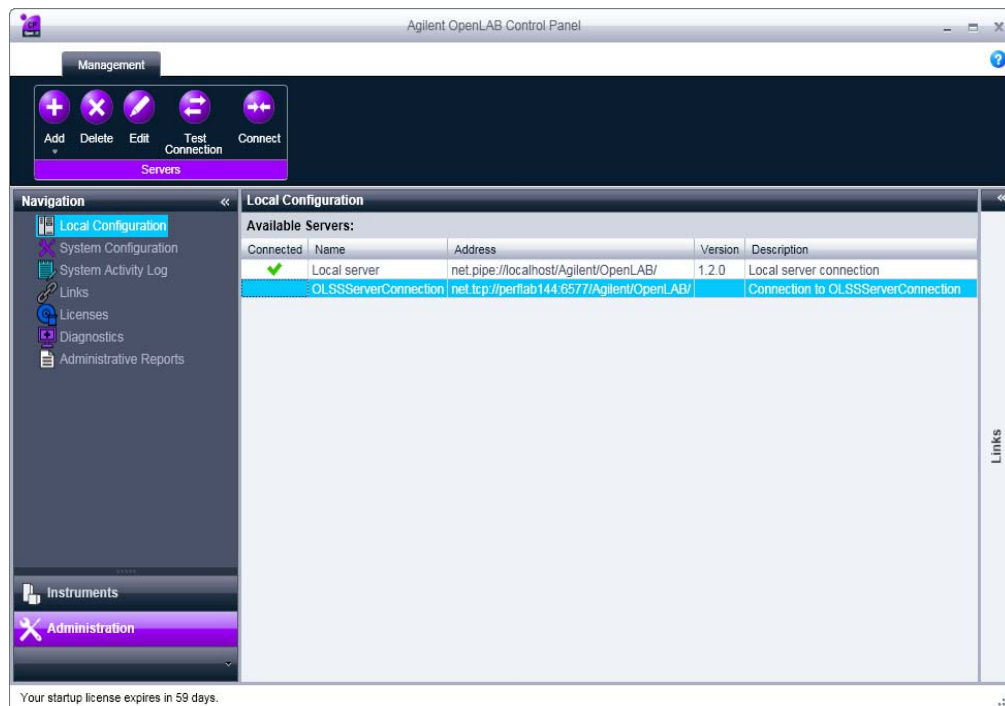


Figure 3 Reconnecting to the central OpenLAB Shared Services server

- 2 Select the central OpenLAB Shared Services server in the list of **Available Servers** and click the **Connect** button.
- 3 Confirm that you want to connect the central OpenLAB Shared Services server again.

Preparation: Instrument Configuration

In order to use the instruments that are configured on the central OpenLAB Shared Services server and connected to a given workstation, they need to be made available in the local OpenLAB Shared Services instance on that workstation. Please note that all instruments that are to be used in case of a failover must have been configured on the central OpenLAB Shared Services server first.

To make the instruments available on the workstation PC open a command prompt on the workstation and navigate to the OpenLAB CDS ChemStation core directory in the ChemStation installation folder (e.g., c:\Chem32\Core). Run the OlssFailover.bat script file. This script copies instruments configured on the central OpenLAB Shared Services to the local OpenLAB Shared Services database.

If the local OpenLAB Shared Services instance has been configured to use an authentication other than **None**, you need to provide the username and password of an administrative user as parameters in the syntax `OlssFailover.bat [username] [password]`.

If you have made instruments available on the local OpenLAB Shared Services and then configured additional instruments, or removed instruments on the central OpenLAB Shared Services server, then we recommend repeating the above.

You can omit this preparation step and execute the failover batch file once the emergency situation has occurred. This has the advantage that all instrument configurations are current. We recommend executing the failover batch file ahead of time because a user in the laboratory may not be able to execute a batch file and will not have the required user credentials available.

Preparation: Methods and Sequences

For an OpenLAB ECM-based system, please ensure that you have all methods and sequence templates that are required even if OpenLAB ECM is unavailable locally on the workstation. This may require periodic updates of the local methods and sequences from master methods and sequences kept in OpenLAB ECM.

Preparation: Licenses

Case 1

If the central license server becomes unavailable the ChemStation on a Workstation PC can fall back to a local license service. To prepare for this scenario, you can install failover licenses on the local license service.

Failover licenses are additional workstation licenses that are installed on a workstation PC.

- 1 Obtain a failover license product (Product Number M8205AA Option 002: OpenLAB CDS ChemStation Failover Workstation License).

This failover license product includes a workstation core license, drivers and add-ons for a workstation with up to four instruments.

- 2 Add the failover license product to the license pool in SubscribeNet.

NOTE

You can also use the licenses already available in your license pool for a Networked Workstation. However, this is going to remove licenses from the pool of concurrent licenses for a Networked Workstation.

- 3 In SubscribeNet configure a failover license file for those instruments that are to be run in the emergency mode.

For example, a failover license for a workstation with one GC- and one 3D LC instrument includes:

- one OpenLAB CDS ChemStation License
- one OpenLAB CDS Instrument Driver for Agilent GC License
- one OpenLAB CDS Instrument Driver for Agilent LC License
- one OpenLAB CDS 3D UV Add-on License

Configure a license file with the four licenses listed below and enter the MAC Address of the workstation PC that the license file is to be put on. Store it locally on the workstation PC where you want to install it.

- 4 Go to the **Administration** page in OpenLAB Control Panel and click the **Licenses** node.
- 5 In the ribbon at the top click the **Add** button.
- 6 In the **Add Licenses** dialog browse to the location of the license file and add it (see [Figure 4](#) on page 10).

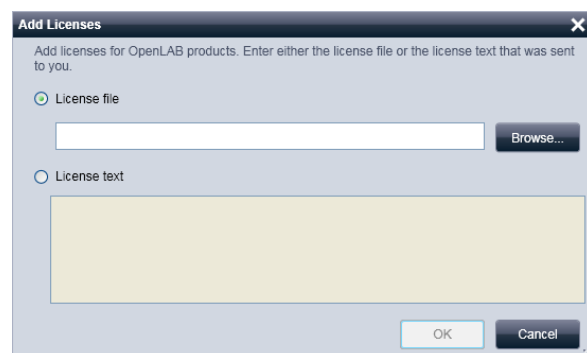


Figure 4 Entering the failover license for the local license service in the **Add Licenses** dialog

Case 2

If the OpenLAB ECM server and/or Domain Controller are unavailable, and the central license server (on the OpenLAB Shared Services server host machine) is still available, the central license server can still be used. However, it is necessary to fall back to the local OpenLAB Shared Services instance using authentication mode **None** or **Internal**. Example: OpenLAB ECM server is unavailable, license server is available. Failover is necessary since authentication cannot be against OpenLAB ECM, but licenses can still be retrieved from the central license server.

The central license server needs to be declared in the local OpenLAB Shared Services instance.

- 1 On the local OpenLAB Control Panel open the **Administration** page (see [Figure 2](#) on page 7) and select the **Local Configuration** node in the **Navigation** pane.
- 2 Click the **Switch to Failover Mode** button.
- 3 Confirm the usage of the failover mode and the restart of the OpenLAB Control Panel.
- 4 Open the **Administration** tab again and click the **Licenses** node in the **Navigation** tree.
- 5 Click the **Change Server** button. In the **Change License Server** dialog enter the name of the central license server to be used (see [Figure 5](#) on page 11).

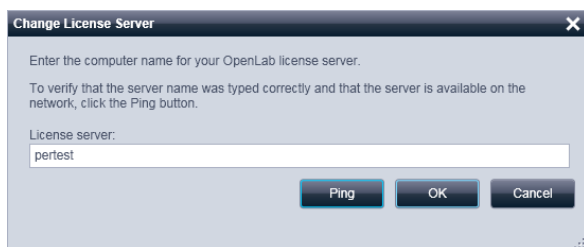


Figure 5 Changing to a central license server in the Change License Server dialog

Reconnect to the central OpenLAB Shared Services server

Once the central license server has been declared in the local OpenLAB Shared Services instance, reconnect to the central OpenLAB Shared Services server.

- 1 On the local OpenLAB Control Panel open the **Administration** page (see [Figure 3](#) on page 8) and select the **Local Configuration** node in the **Navigation** pane.
- 2 Select the central OpenLAB Shared Services server in the list of **Available Servers** and click the **Connect** button. Confirm that you want to connect the central OpenLAB Shared Services server again.

Networked Workstation: Failover to Local OpenLAB Shared Services Instance – Instructions for the Emergency Situation

Whenever the OpenLAB Control Panel cannot communicate with OpenLAB Shared Services server, the OpenLAB Control Panel shows a dialog box that allows users to switch to the failover mode (see [Figure 6](#) on page 12). The OpenLAB Control Panel start-up screen provides a number of options for the failover situation; these are **Switch to Failover mode**, **Reconnect**, and **Ping**.

If OpenLAB Control Panel cannot communicate with its authentication backend (OpenLAB ECM server and/or Domain Controller), the OpenLAB Control Panel application will not start. If this happens, disconnect the ChemStation workstation PC from the network while starting the OpenLAB Control Panel. When starting a ChemStation workstation PC disconnected from the network, OpenLAB Control Panel shows a dialog box that allows users to switch to the failover mode (see [Figure 6](#) on page 12).



Figure 6 OpenLAB Control Panel starting up without connection to the OpenLAB Shared Services server

- 1 Click the **Reconnect** button. In case of a short network or server outage (e.g., of several minutes), this allows you to reconnect to the OpenLAB Shared Services server. Alternatively, click the **Ping** button. This allows you to check if the server can be reached again.
- 2 If it has become clear that the network or server outage is going to be longer, click the **Switch to Failover mode** button. OpenLAB Control Panel connects to the local OpenLAB Shared Services instance. If authentication is setup on the local OpenLAB Shared Services instance you will be asked for your credentials.
- 3 Since the instruments and licenses have been made available in the preparation steps, instruments can immediately be used from the failover session. All instrument-related data, methods and configurations are available at their original locations. In addition, the instrument configuration is also available at its original location.

WARNING

Inconsistencies between the local OpenLAB Shared Services configuration and the central OpenLAB Shared Services configuration

- Do not create new instruments or delete existing ones while connected to the local OpenLAB Shared Services instance.
-

Restoring the Connection to the Central OpenLAB Shared Services Server

Once the connection to the central OpenLAB Shared Services server or authentication backend is restored, the OpenLAB Control Panel can be reconnected to the central OpenLAB Shared Services server.

Preparations

Shut down ChemStation instances running on the local OpenLAB Shared Services instance before reconnecting to the central OpenLAB Shared Services server.

- 1 In OpenLAB Control Panel go to the **Administration** page and navigate to the **Local Configuration** node (see [Figure 2](#) on page 7).
- 2 Select the connection to the remote OpenLAB Shared Services server and click the **Connect** button in the ribbon (see [Figure 3](#) on page 8).
- 3 OpenLAB Control Panel will restart and connect to the remote OpenLAB Shared Services server.

NOTE

Instruments are already available in the remote OpenLAB Shared Services server and need not be reconfigured.

Distributed System: Preparation

For the OpenLAB CDS Distributed System, this technical note describes a workstation-based approach to remediate server unavailability. It requires dedicated failover workstation licenses that are commercially available. If any of the required authentication backends (OpenLAB Shared Services server, OpenLAB ECM server or Domain Controller) is not available, or in case of a network outage, it is not possible to failover directly on the CDS client or the AIC. For instruments that are required to run continuously (24/7), we are suggesting to set up an OpenLAB CDS ChemStation Edition Workstation on a separate PC using failover licenses and to use this workstation as a failover system in case of an emergency. This failover workstation allows controlling instruments in case of a failure of any of the authentication back-ends as well as a network outage.

In addition, Agilent is investigating an approach that will be based on the existing AIC systems. This concept may become available within the next six months. For customers who have an urgent need for failover configuration we recommend to use the concept described here to ensure continued operation of their OpenLAB CDS Distributed System in case of network or server outages.

Preparation: Failover Workstation

The failover workstation will be used in case ChemStation remote desktop sessions on the AIC are no longer accessible. For convenience we recommend to equip the workstation two network cards – one to connect to the laboratory network and one to connect directly to the instrument. This allows easy retrieval of data e.g. for storage in OpenLAB ECM once the emergency situation has been resolved. Alternatively a workstation equipped with one network card can be used to connect directly to the instrument.

Working with the failover workstation may need adaptations to the IP address of the instrument.

If both the AIC and the failover workstation have two network cards, the second network card of the failover workstation should be configured the same as the second network card on the AIC. In this case, the instrument can be reconnected from the AIC to the failover workstation without changing its IP-address.

If the instrument is set up on the LAN, the IP-address of the instrument needs to be adapted to be in the subnet of the second network card of the failover workstation. Once the emergency situation is over, the instrument needs to be reconfigured to its original IP-address before connecting it to the AIC again.

To prepare the failover workstation for an emergency situation, please do the following:

- 1 Install failover licenses (see “Case 1” on page 10).
- 2 Configure all instruments for which you require continued operation on this workstation. To do so disconnect the idle instrument from the AIC and connect it to the failover workstation. Then configure the instrument in OpenLAB Control Panel on the failover workstation.
- 3 Make all required methods, sequence and report templates available locally.

Distributed System: Instructions for the Emergency Situation

Whenever the OpenLAB Control Panel cannot communicate with its authentication backend (OpenLAB Shared Services server, OpenLAB ECM server, or Domain Controller), the OpenLAB Control Panel shows a dialog that allows users to switch to the failover mode (see [Figure 6](#) on page 12). Click the **Exit** button on the CDS client. Since ChemStation is not installed on the CDS client, it is not possible to use the option **Switch to Failover Mode** on the CDS client.

The ChemStation instances on the AIC continue to run even if the OpenLAB ECM server, OpenLAB Shared Services server or license server is unavailable. Once the sequences on the AIC are completed and the instrument is idle, disconnect the instrument from the AIC (by removing the network cable from the instrument) and connect the instrument directly to the failover workstation. Since the instruments and licenses have been made available in the preparation steps instruments can immediately be used on the failover workstation.

Reconnecting the sessions on the AIC

Once the emergency situation is over, disconnect the instruments from the failover workstation, and connect it again to the AIC. Now it is possible to reconnect to the instrument sessions from the CDS client.

Storing the data from the failover workstation into OpenLAB ECM

We recommend installing an OpenLAB ECM web client (not ChemStation/ OpenLAB ECM integration) on the failover workstation. Once the emergency situation has been resolved, open the OpenLAB ECM Web client on the failover workstation and manually upload the data acquired during the emergency situation to OpenLAB ECM.



M8301-90200

Part Number: M8301-90200

Edition: 03/12
Printed in Germany

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Hewlett-Packard-Strasse 8
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